



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,405	09/24/2001	Toru Katagiri	837.1971	5622
21171	7590	04/05/2005	EXAMINER	
LE, TRAN Q				
ART UNIT			PAPER NUMBER	
2633				

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/960,405	KATAGIRI ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Tran Q. Le	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 24 September 2001.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-28 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-23 and 25-28 is/are rejected.  
 7) Claim(s) 24 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 24 September 2001 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>09/24/01</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

### **DETAILED ACTION**

1. Applicant's election without traverse of Species A (Figures 4 and 13) on which claims 1-2 and 10-28 read, in the reply filed on October 28, 2004 is acknowledged.

#### ***Drawings***

2. Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### ***Specification***

3. The disclosure is objected to because of the following informalities:
  - a) The brief description of figures 2 and 3 on p. 10 should indicate "in the prior art" at the end of each sentence.
  - b) Typing error "chars" on p. 5, 2<sup>nd</sup> paragraph should be corrected to "characteristic".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 10-14, 20, 25 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated over Otsuka et al. (6,538,782).

Regarding claim 1, Otsuka discloses an optical node device applicable to an optical network including a closed loop provided by an optical fiber, comprising:

a tunable wavelength selecting element (11, fig. 1) adapted to input WDM signal light (INPUT, fig. 1 and col. 8, lines 1-5) obtained by wavelength division multiplexing a plurality of optical signals having different wavelengths, the tunable wavelength selecting element having a function of dropping at least one optical signal (input of 30, fig. 1) from the WDM signal light and a function of adding at least one optical signal (output of 40, fig. 1) to at least one unassigned wavelength channel of the WDM signal light; and

a wavelength selecting filter (wavelength selecting AOTF, fig. 1, e.g. 33(1-M)) optically connected to the tunable wavelength selecting element for selectively passing the dropped channels through (fig. 1 and col. 2, lines 44-54).

Regarding claim 10, Otsuka discloses the tunable wavelength selecting element comprises an acousto-optic tunable filter (11, fig. 1 and col. 8, lines 16-22).

Regarding claim 11, Otsuka discloses the tunable wavelength selecting element (11, fig. 1) has a first input port for inputting the WDM signal light (INPUT, fig. 1), a second input port for inputting an optical signal to be added to the WDM signal light (output of 40, fig. 1), a first output port for outputting an optical signal to be passed through the tunable wavelength selecting element (OUTPUT, fig. 1), and a second output port for outputting an optical signal to be dropped from the WDM signal light (input of 30, fig. 1 and col. 8, lines 1-15).

Regarding claim 12, Otsuka discloses an optical coupler (45, fig. 1) having a plurality of input ports (1-M) and an output port connected to the second input port of the tunable wavelength selecting element (input from the light insertion section 40, fig. 1); an optical modulator (43, fig. 1) connected to each of the plurality of input ports of the optical coupler; and a tunable light source connected to the optical modulator (41A1-41An, fig. 1).

Regarding claim 13, Otsuka discloses an optical coupler (32, fig. 1) having an input port (input of 30, fig. 1) connected to the second output port of the tunable wavelength selecting element (branching output of 11, fig. 1), and a plurality of output ports (1-M); a tunable filter (33, fig. 1) connected to each of the plurality of output ports of the optical coupler; and an optical receiver (34, fig. 1) connected to the tunable filter.

Regarding claim 14, Otsuka discloses an optical amplifier connected to the tunable wavelength selecting element (14, fig. 1).

Regarding claim 20, Otsuka discloses an optical node device (fig. 8) applicable to an optical network including a closed loop provided by an optical fiber, comprising:

an optical demultiplexer (left AWG) having an input port for inputting WDM signal light ( $\lambda_1 \sim \lambda_n$ ) obtained by wavelength division multiplexing N (N is an integer satisfying  $1 < N$ ) optical signals having different wavelengths and N output ports (outputs of left AWG) for respectively outputting the N optical signals separated from the WDM signal light;

N 2.times.2 optical switches (2x2 SWITCH) each having first and second input ports (two inputs coming from the left AWG and the nxn switch) and first and second output ports (two outputs going to the right AWG and to nxn SWITCH), the N optical signals output from the optical demultiplexer being supplied to the first input ports of the N 2.times.2 optical switches (fig. 8), respectively, each of the N 2.times.2 optical switches switching between a bar state where the first and second input ports are connected to the first and second output ports, respectively, and a cross state where the first and second input ports are connected to the second and first output ports, respectively (col. 2, lines 11-15, note that the control of the branching, insertion or transmission of a light signal done by controlling the switching state indicates the optional switching between a bar state and a cross state); and

an optical multiplexer (right AWG) having N input ports for respectively inputting N optical signals output from the first output ports of the N 2.times.2 optical switches (lines connecting from each 2x2 switch to the right AWG, fig. 8), and an output port for

Art Unit: 2633

outputting WDM signal light (output light signal from  $\lambda_1 \sim \lambda_n$ ) obtained by wavelength division multiplexing the N optical signals input to the N input ports.

Regarding claim 25, Otsuka further discloses a plurality of optical transmitters (wavelength selection-type optical transmitter, fig. 8) for outputting optical signals (arrowed inputs to the 2x2 switch, fig. 8) to be added to any unassigned channels of the WDM signal light supplied to the optical demultiplexer (left AWG, fig. 8); and an optical switch (left nxn switch, fig. 8) for switching the connections between the plurality of optical transmitters and the second input ports of the N 2.times.2 optical switches (shown in fig. 8).

Regarding claim 26, Otsuka also discloses a plurality of optical receivers (wavelength selection-type optical receiver, fig. 8) for receiving optical signals (arrowed inputs to the right nxn switch, fig. 8) dropped from the WDM signal light supplied to the optical demultiplexer; and an optical switch (right nxn switch, fig. 8) for switching the connections between the plurality of optical receivers and the second output ports of the N 2.times.2 optical switches (shown in fig. 8).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No. 6,538,782) in view of Suzuki (US Patent No. 4,945,531), and in further view of Milton (US Patent No. 6,563,615).

Regarding claim 2, Otsuka discloses all the aspects of claim 1, but fails to teach the wavelength selecting filter comprises an interleaver having an input port and first and second output ports, and an optical coupler having first and second input ports and an output port, the first and second input ports of the optical coupler being optically connected to the first and second output ports of the interleaver, respectively; the interleaver and the optical coupler being arranged along the closed loop.

However, Suzuki, in the same field of endeavor, teaches an optical filter (100, fig. 1) comprising an interleaver (101) having an input port (623) and first and second output ports (outputs of 101), and an optical coupler (102) having first and second input ports (inputs of 102) and an output port (627), the first and second input ports of the optical coupler being optically connected to the first and second output ports of the interleaver, respectively (fig. 1).

Moreover, Milton teaches an optical fiber ring (fig. 1) with interconnecting nodes which add/drop bands of wavelengths arranged along the closed loop.

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use an optical filter such as the one of Suzuki in the wavelength selecting filter of Otsuka and arrange it along a closed loop such as the one of Milton in order to suppress the ASE noise from an optical WDM signal passing

through each add/drop node and being accumulated throughout the WDM optical ring network.

Regarding claim 22, the combination of Otsuka and Milton disclose all the aspects of claims 20 and 21, except fails to teach the transmission band of each of the optical demultiplexer and the optical multiplexer per wavelength channel has a central wavelength substantially coinciding with the central wavelength of each wavelength channel of the WDM signal light.

However, Suzuki teaches an optical demultiplexer (101, fig. 1) and the optical multiplexer (102, fig. 1) of an optical filter (100) has a central wavelength substantially coinciding with the central wavelength of each wavelength channel of the WDM signal light (623, fig. 1, fig. 2 and col. 3, lines 15-23).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use an optical filter of Suzuki in the modified optical node device of Otsuka and Milton in order to provide ASE noise filtering for an optical multiplexed signal passing through each node of a WDM optical ring network.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No. 6,538,782) in view of Suzuki (US Patent No. 4,945,531) and Milton (US Patent No. 6,563,615), and in further view of Xie (US Patent No. 6,674,968).

Regarding claim 3, the combination of Otsuka, Suzuki and Milton further discloses the WDM signal light has a plurality of wavelength channels arranged at substantially equal intervals in the wavelength domain, but still fails to teach the input

port and the first output port of the interleaver are coupled by a transmission band including the wavelength of any odd-numbered one of the wavelength channels; and the input port and the second output port of the interleaver are coupled by a transmission band including the wavelength of any even-numbered one of the wavelength channels.

However, Xie teaches the WDM signal light at the input port of the interleaver (120, fig. 1) are separated into the odd-numbered wavelength channels ( $\lambda_1, 3, 5$ ) and the even-numbered wavelength channels ( $\lambda_2, 4, 6$ ).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use an interleaver such as the one of Xie in the modified wavelength selecting filter of Otsuka, Suzuki and Milton in order to provide increased spacing between the adjacent odd-numbered channels and increased spacing between the adjacent even-numbered channels.

9. Claims 15-19, 21, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No. 6,538,782) in view of Milton (US Patent No. 6,563,615).

Regarding claim 15, Otsuka discloses all the aspects about an optical node device (see rejection of claim 1), but fails to teach a plurality of optical node devices arranged along the closed loop provided by an optical fiber.

However, Milton teaches a system (1, fig. 1) comprising: a closed loop provided by an optical fiber (2, 3); and a plurality of optical node devices (4-8) arranged along the

closed loop; at least one of the plurality of optical node device adds/drops a predetermined band of wavelengths specific to that node (p. 2, par. 0038 - p. 3, par. 40).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use a system such as the one of Milton with at least one optical node device of Otsuka in order to sufficiently eliminate the ASE noise accumulated within a WDM optical ring network and therefore prevent the oscillation of optical power of the wavelength channels circulating within the loop.

Regarding claim 16, the combination of Otsuka and Milton teaches at least one optical amplifier arranged along the closed loop (12, 14, fig. 1 of Otsuka and fig. 1 of Milton).

Regarding claim 17, Otsuka further discloses the tunable wavelength selecting element (11, fig. 1) has a first input port for inputting the WDM signal light (INPUT, fig. 1), a second input port for inputting an optical signal to be added to the WDM signal light (output of 40, fig. 1), a first output port for outputting an optical signal to be passed through the tunable wavelength selecting element (OUTPUT, fig. 1), and a second output port for outputting an optical signal to be dropped from the WDM signal light (input of 30, fig. 1 and col. 8, lines 1-15).

Regarding claim 18, Otsuka further teaches at least one optical node device further comprises: an optical coupler (45, fig. 1) having a plurality of input ports (1-M) and an output port connected to the second input port of the tunable wavelength selecting element (input from the light insertion section 40, fig. 1); an optical modulator

(43, fig. 1) connected to each of the plurality of input ports of the optical coupler; and a tunable light source connected to the optical modulator (41A1-41An, fig. 1).

Regarding claim 19, Otsuka teaches at least one optical node device further comprises: an optical coupler (32, fig. 1) having an input port (input of 30, fig. 1) connected to the second output port of the tunable wavelength selecting element (branching output of 11, fig. 1), and a plurality of output ports (1-M); a tunable filter (33, fig. 1) connected to each of the plurality of output ports of the optical coupler; and an optical receiver (34, fig. 1) connected to the tunable filter.

Regarding claim 21, Otsuka discloses all the aspects of the claimed invention, except fails to teach the WDM signal light has a plurality of wavelength channels arranged at substantially equal intervals in the wavelength domain; the input port and the i-th (i is an integer satisfying 1.ltoreq.i.ltoreq.N) output port of the optical demultiplexer are coupled by a transmission band including the wavelength of any one of the wavelength channels; the j-th (j is an integer satisfying 1.ltoreq.j.ltoreq.N) input port and the output port of the optical multiplexer are coupled by a transmission band including the wavelength of any one of wavelength channels.

However, Milton teaches a WDM signal light has a plurality of wavelength channels arranged at substantially equal intervals in the wavelength domain (p. 1, par. 0039);

the input port and the i-th (i is an integer satisfying 1.ltoreq.i.ltoreq.N) output port of the optical demultiplexer (10, fig. 3) are coupled by a transmission band including the wavelength of any one of the wavelength channels (p. 3, par. 0042);

the j-th (j is an integer satisfying 1.ltoreq.j.ltoreq.N) input port and the output port of the optical multiplexer (17, fig. 3) are coupled by a transmission band including the wavelength of any one of wavelength channels (p. 3, par. 0042).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use a system such as the one of Milton with at least one optical node device of Otsuka in order to provide direct communication between a pair of nodes in the network sharing a common band without the active intervention of any intervening node.

Regarding claim 27, Otsuka discloses all the aspects about an optical node device (see rejection of claim 20), but fails to teach a plurality of optical node devices arranged along the closed loop provided by an optical fiber.

However, Milton teaches a system (1, fig. 1) comprising: a closed loop provided by an optical fiber (2, 3); and a plurality of optical node devices (4-8) arranged along the closed loop; at least one of the plurality of optical node device adds/drops a predetermined band of wavelengths specific to that node (p. 2, par. 0038 - p. 3, par. 40).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use a system such as the one of Milton with at least one optical node device of Otsuka in order to provide efficient add/drop function for each optical node and to suppress the oscillation of optical power of the wavelength channels circulating within a WDM optical ring network.

Regarding claim 28, Otsuka further discloses at least one optical amplifier (12, 14, fig. 1) arranged along the closed loop.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (US Patent No. 6,538,782) in view of Milton (US Patent No. 6,563,615), and in further view of Ogusu et al. (US Patent No. 5,917,625).

Regarding claim 23, the combination of Otsuka and Milton discloses all the aspects of claims 20 and 21, except fails to teach the transmission band of each of the optical demultiplexer and the optical multiplexer per wavelength channel is wider than the band of each wavelength channel of the WDM signal light.

However, Ogusu teaches the transmission band of each of the optical demultiplexer and the optical multiplexer per wavelength channel is wider than the band of each wavelength channel of the WDM signal light (fig. 11 and col. 11, lines 16-21).

Therefore, it would have been obvious for one ordinary skill in the art at the time the invention was made to use an optical demultiplexer/multiplexer such as the one of Ogusu in the modified optical node device of Otsuka in order to efficiently suppress the ASE noise and therefore eliminating oscillation of optical power.

#### ***Allowable Subject Matter***

11. Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 24, the prior art of record fails to teach specifically the transmission band of the optical demultiplexer per wavelength channel has a central wavelength substantially coinciding with a first wavelength shorter than the central wavelength of each wavelength channel of the WDM signal light; and the transmission band of the optical multiplexer per wavelength channel has a central wavelength substantially coinciding with a second wavelength longer than the central wavelength of each wavelength channel of the WDM signal light.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Terahara (US Patent No. 6,211,980) is cited to show a bi-directional wavelength switching device and wavelength demultiplexing/multiplexing device.

Onaka et al. (US Patent No. 6,351,323) is cited to show an OADM system utilizing an AOTF and an optical switch for adding/dropping optical signals.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran Q. Le whose telephone number is (571)272-2046. The examiner can normally be reached on 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TQL



JASON CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600